WHAT IS CLAIMED IS:

1. An apparatus for regenerating a distorted optical signal through reamplification, regenerating, and retiming processes in an optical communication network, the apparatus comprising:

an optical clock generation section that generates an optical clock signal of a specified frequency;

an optical signal sampling section that samples a distorted non-return-to-zero (NRZ) optical signal in synchronization with the clock signal from the optical clock g eneration section;

an optical signal regenerating section that regenerates an output signal of the sampling section in synchronization with the clock signal from the optical clock generation section; and

a return-to-zero (RZ)/NRZ conversion section that converts the optical signal reshaped by the optical signal regenerating section into an NRZ optical signal.

2. The apparatus as claimed in claim 1, wherein the optical clock generation section comprises:

an electric clock generator that generates an electric clock signal in the form of a sine wave;

an optical ultra-short pulse generator that generates an optical ultra-short clock pulse in synchronization with the clock signal generated by the electric clock generator;

an optical splitter that splits the optical clock pulse generated by the optical ultra-short pulse generator into a predetermined number of optical pulse signals; and

an optical coupler that couples the predetermined number of optical pulse signals split by the optical splitter after delaying the predetermined number of optical pulse signals for a predetermined time through an optical delay line.

3. The apparatus as claimed in claim 1, wherein:

the predetermined number of optical pulse signals is at least two; and

the optical signal sampling section comprises first and second optical signal sampling sections,

wherein, one of the optical clock signals generated by the optical clock generation section and split by the optical coupler is inputted to the first optical signal sampling section without delay, and another of the optical clock signals is inputted to the second optical signal sampling section through a half-bit optical delay.

4. The apparatus as claimed in claim 3, further comprising:

a power comparator that compares a power of an input signal of the all-optical signal regenerating apparatus with powers of output signals of the first and second sampling sections; and

an optical switch that receives a control signal from the power comparator, and selects an accurately sampled output signal.

5. The apparatus as claimed in claim 3, wherein each of the first and second optical signal sampling section comprises a Mach-Zehnder interferometer (MZI) and an optical circulator.

6. The apparatus as claimed in claim 1, wherein the RZ/NRZ conversion section comprises:

an optical circulator that receives the RZ optical signal, and outputs the NRZ optical signal;

a continuous wave (CW) laser; and

a Mach-Zehnder interferometer (MZI) that receives the optical signals from the optical circulator and the CW laser, and outputs the NRZ optical signal to the optical circulator.

7. The apparatus as claimed in claim 6, wherein the MZI comprises:

a first optical coupler that receives, divides, and couples the optical clock signal;

a second optical coupler that receives, divides, and couples the distorted NRZ optical signal;

a delay that delays for a predetermined time the optical clock signal split by the first coupler;

a first semiconductor optical amplifier that receives one of the optical clock signals delayed by the delay and one optical signal divided by the second optical coupler;

a second semiconductor optical amplifier that receives the other of the optical clock

signals delayed by the delay and the other optical signal divided by the second optical coupler; and

a phase shifter that shifts a phase of an output signal of the second semiconductor amplifier, and inputs the phase-changed signal to the first optical coupler.

8. A method of regenerating a distorted optical signal through reamplification, regenerating, and retiming processes in an optical communication network, the method comprising the steps of:

generating an optical clock signal;

sampling the distorted optical signal in synchronization with the optical clock signal;

regenerating the sampled optical signal in synchronization with the optical clock signal; and

converting the reshaped optical signal into a non-return-to-zero optical signal.

9 The method as claimed in claim 8, wherein the step of sampling the distorted optical signal further comprises the steps of:

dividing the optical clock pulse signal into a non-delayed optical clock signal and a half-bit-delayed optical clock signal;

sampling the distorted optical signal by two optical sampling sections in synchronization with the respective divided optical clock signals; and

selecting an accurately sampled optical signal by comparing powers of the sampled

optical signals.